REMARKS

In the last Office Action, the Examiner rejected claim 1 under 35 U.S.C. §112, second paragraph, for indefiniteness. Claim 1 was rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,899,471 to Sasaki et al. ("Sasaki '471"), U.S. Patent No. 4,783,915 to Sasaki et al. ("Sasaki '915), U.S. Patent No. 3,913,247 to Ruhl, Japanese Patent No. 6-193025 ("Japan '025"), or Japanese Patent No. 58-76623 ("Japan '623").

In accordance with the present response, original independent claim 1 has been amended to further patentably distinguish from the prior art of record. Claim 1 has been further amended to overcome the rejection under 35 U.S.C. §112, second paragraph, improve the wording, and to bring it into better conformance with U.S. practice. New claims 2-14 have been added to provide a fuller scope of coverage. A new abstract which more clearly reflects the invention to which the amended and new claims are directed has been substituted for the original abstract.

In view of the foregoing, applicants submit that the rejection of claim 1 under 35 U.S.C. §112, second paragraph, has been overcome and should be withdrawn.

Applicants respectfully request reconsideration of their application in light of the following discussion.

Brief Summary of the Invention

The present invention is directed to a snow removal machine.

Fig. 15 shows a conventional auger device 200 for a snow removal machine. As described in the specification (pgs. 1-4), the design of the conventional auger device 200 (e.g., the construction and positioning of auger blades 205, 206) has caused various problems in connection with its efficiency in collecting snow during a snow removal operation. For example, when foreign matter 208 (e.g., a stone buried in the snow) is caught in a gap 210 between the auger blade 205 and an auger housing 209 during a snow removal operation, an operator must remove the foreign matter manually before the snow removal machine is allowed to continue with a snow removal operation. Furthermore, the power to the auger device 200 must be stopped before such manual operation to remove the foreign matter 208. As a result, the workability and operating efficiency of the conventional snow removal machine are poor.

The present invention overcomes the foregoing drawbacks in the conventional art. Figs. 1-10 show an embodiment of a snow removal machine 10 according to the present invention embodied in the claims. The snow removal machine 10 has an auger device 30 having first and second auger shafts 45, 46 mounted to undergo rotation about respective rotational axes. The first auger shaft 45 extends

in a first direction generally transverse to a central axis of the snow removal machine 10. The second auger shaft 46 extends in a second direction opposite the first direction and generally transverse to the central axis of the snow removal machine 10.

A first auger 50 has an outer helical auger blade 55, an intermediate helical auger blade 56 and an inner helical auger blade 57 mounted on the first auger shaft 45 for rotation therewith and extending sequentially from an end of the first auger shaft 45 toward the central axis of the snow removal machine 10 for directing snow toward the central axis. The outer helical auger blade 55 and the inner helical auger blade 57 are disposed along a common first helical path and are spaced-apart from one another along the rotational axis of the first auger shaft 45. The intermediate helical auger blade 56 is disposed along a second helical path angularly shifted substantially 180 degrees with respect to the first helical path.

A second auger 51 has an outer helical auger blade 55, an intermediate helical auger blade 56 and an inner helical auger blade 57 mounted on the second auger shaft 46 for rotation therewith and extending sequentially from an end of the second auger shaft 46 toward the central axis of the snow removal machine 10 for directing snow toward the central axis. The outer helical auger blade 55 and the inner helical

auger blade 57 of the second auger 51 are disposed along a common first helical path and are spaced-apart from one another along the rotational axis of the second auger shaft 46. The intermediate helical auger blade 56 of the second auger 51 is disposed along a second helical path angularly shifted substantially 180 degrees with respect to the first helical path of the outer and inner helical auger blades 55, 57 of the second auger 51.

By the foregoing construction and arrangement of the helical auger blades of the first and second augers, the intermediate helical auger blades, in addition to the outer and inner helical auger blades, function to break the masses of snow. As a result, any foreign matter which may come into contact with the helical auger blades is automatically dislodged by the helical auger blades without requiring an interruption of the operation of the auger device and a manual operation to remove the foreign matter. Moreover, the auger device of the snow removal machine according to the present invention directs snow toward a central axis of the snow removal machine with high efficiency as compared with the conventional art.

Traversal of Prior Art Rejections

Claim 1 was rejected under 35 U.S.C. §102(b) as being anticipated by Sasaki '471, Sasaki '915, Ruhl, Japan '025, or Japan '623. Applicants respectfully traverse this rejection and submit that amended independent claim 1 recites subject matter which is not identically disclosed or described in Sasaki '471, Sasaki '915, Ruhl, Japan '025 and Japan '623.

Amended independent claim 1 is directed to a snow removal machine and requires left and right auger shafts mounted to undergo rotation about respective rotational axes thereof, the auger shafts extending horizontally from a transverse center of the snow removal machine in respective leftward and rightward directions. Amended claim 1 further requires a left auger having an outer helical auger blade, an intermediate helical auger blade and an inner helical auger blade mounted on the left auger shaft for rotation therewith and extending sequentially from an end of the left auger shaft toward the transverse center of the snow removal machine for collecting snow toward the transverse center of the snow removal machine, the outer helical auger blade and the inner helical auger blade being disposed along a common first helical path and spaced-apart from one another along the rotational axis of the left auger shaft, and the intermediate helical auger blade being disposed along a second helical path

angularly shifted substantially 180 degrees with respect to the first helical path.

Amended claim 1 further requires a right auger having an outer helical auger blade, an intermediate helical auger blade and an inner helical auger blade mounted on the left auger shaft for rotation therewith and extending sequentially from an end of the right auger shaft toward the transverse center of the snow removal machine for collecting snow toward the transverse center of the snow removal machine, the outer helical auger blade and the inner helical auger blade of the right auger being disposed along a common first helical path and spaced-apart from one another along the rotational axis of the right auger shaft, and the intermediate helical auger blade of the right auger being disposed along a second helical path angularly shifted substantially 180 degrees with respect to the first helical path of the outer and inner helical auger blades of the right auger.

The cited references to Sasaki '471, Sasaki '915, Ruhl, Japan '025 and Japan '623 do not disclose or describe the structural combination of the snow removal machine recited in amended independent claim 1.

Sasaki '471 discloses an auger for a self-propelled snow removing machine (Fig. 3). Left and right augers are mounted on respective rotational shafts 17 for rotation therewith. Each of the left and right augers has blades 27

provided with three fins 27a having apexes or bases 27b detachably attached to three respective brackets 17a (col. 3, lines 54-57).

Applicants submit that the fins 27a, bases 27b, and brackets 17a in Sasaki '471 do not have the structural and positional configuration required by the outer helical auger blade, intermediate helical auger blade, and inner helical auger blade, respectively, of the left and right augers recited in amended claim 1. More specifically, Sasaki '471 does not disclose or describe an auger having an outer helical auger blade and an inner helical auger blade disposed along a common first helical path and spaced-apart from one another along a rotational axis of the auger shaft, as recited in amended claim 1. In this regard, the fin 27a and corresponding bracket 17a of the blade 27 shown in Fig. 3 of Sasaki '471 are connected together at a portion of the auger shaft 17, not spaced-apart from one another along a rotational axis of the auger shaft, as recited in amended claim 1.

Furthermore, Sasaki '471 does not disclose or describe an auger having an intermediate helical auger blade disposed along a second helical path angularly shifted substantially 180 degrees with respect to the first helical path, as recited in amended claim 1. In Sasaki '471, the auger blades 27 are arranged along a single helical path.

Sasaki '915 discloses a snow removing machine having an auger device with generally the same construction as the auger device disclosed in Sasaki '471. Sasaki '915 clearly does not disclose or describe an auger having an outer helical auger blade and an inner helical auger blade disposed along a common first helical path and spaced-apart from one another along a rotational axis of the auger shaft and an intermediate helical auger blade disposed along a second helical path angularly shifted substantially 180 degrees with respect to the first helical path, as recited in amended claim 1, as set forth above for Sasaki '471.

Ruhl discloses an auger for a snow removal machine. As shown in Fig. 4, the auger has inner and outer auger blades 50 integrally and directly connected to one another. Thus Ruhl clearly does not disclose or describe an auger having an outer helical auger blade and an inner helical auger blade disposed along a common first helical path and spaced-apart from one another along a rotational axis of the auger shaft, as recited in amended claim 1. Likewise, Ruhl clearly does not disclose or describe an intermediate helical auger blade disposed along a second helical path angularly shifted substantially 180 degrees with respect to the first helical path, as recited in amended claim 1.

Japan '025 is directed to a snow removal machine having two helical continuous auger blades 90 degrees out of

phase with each other (Fig. 5). Japan '025 clearly does not disclose or suggest an auger having an outer helical auger blade and an inner helical auger blade disposed along a common first helical path and spaced-apart from one another along a rotational axis of the auger shaft, as recited in amended claim 1. Likewise, Japan '025 clearly does not disclose or describe an intermediate helical auger blade disposed along a second helical path angularly shifted substantially 180 degrees with respect to the first helical path, as recited in amended claim 1.

Japan '623 discloses a snow removal machine having three auger blades 8 (Fig. 1). Japan '623 clearly does not disclose or suggest left and right augers each having outer, intermediate and inner helical auger blades, as recited in amended claim 1. Japan '623 only discloses a single auger having the three auger blades 8 mounted on an auger shaft 5. Furthermore, in Japan '623 the three auger blades 8 are arranged along a single spiral path. In contrast, amended claim 1 requires an auger having an outer helical auger blade and an inner helical auger blade disposed along a common first helical path and an intermediate helical auger blade disposed along a second helical path angularly shifted substantially 180 degrees with respect to the first helical path.

In the absence of this disclosure recited in amended independent claim 1, anticipation cannot be found. See, e.g.,

W.L. Gore & Associates v. Garlock, Inc., 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984) ("Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration"); Continental Can Co. USA v. Monsanto Co., 20 USPQ2d 1746, 1748 (Fed. Cir. 1991) ("When more than one reference is required to establish unpatentability of the claimed invention anticipation under § 102 can not be found".); Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 221 USPQ 481, 485 (Fed. Cir. 1984) (emphasis added) ("Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim").

Stated otherwise, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. This standard is clearly not satisfied by Sasaki '471, Sasaki '915, Ruhl, Japan '025 and Japan '623 for the reasons stated above. Furthermore, Sasaki '471, Sasaki '915, Ruhl, Japan '025 and Japan '623 do not suggest the claimed subject matter and, therefore, would not have motivated one skilled in the art to modify the augers of these references to arrive at the claimed invention.

In view of the foregoing, applicants respectfully request that the rejection of claim 1 under 35 U.S.C. §102(b) as being anticipated by Sasaki '471, Sasaki '915, Ruhl, Japan '025 or Japan '623 be withdrawn.

Applicants submit that the prior art of record also does not disclose or suggest the subject matter recited in newly added claims 2-14.

Claims 2-7 depend on and contain all of the limitations of amended independent claim 1 and, therefore, distinguish from the prior art of record at least in the same manner as claim 1.

Moreover, there are separate grounds for patentability for new dependent claims 2-7 which are directed to the specific structure of the left and right augers. No corresponding structure is disclosed or suggested by the prior art of record.

New independent claim 8 is directed to a snow removal machine and requires first and second augers mounted on respective auger shafts and each having an outer helical auger blade, an intermediate helical auger blade and an inner helical auger blade. Claim 8 further requires that the outer helical auger blade and the inner helical auger blade of each of the first and second augers are disposed along a common first helical path and spaced-apart from one another along the rotational axis of the corresponding auger shaft, and that the

intermediate helical auger blade of each of the first and second augers is disposed along a second helical path angularly shifted substantially 180 degrees with respect to the first helical path. No corresponding structural combination is disclosed or suggested by the prior art of record as set forth above for amended independent claim 1.

Claims 8-14 depend on and contain all of the limitations of independent claim 8 and, therefore, distinguish from the prior art of record at least in the same manner as claim 8.

Moreover, there are separate grounds for patentability for new dependent claims 8-14 which are directed to the specific structure of the first and second augers. No corresponding structure is disclosed or suggested by the prior art of record.

In view of the foregoing amendments and discussion, the application is now believed to be in condition for allowance. Accordingly, favorable reconsideration and allowance of the claims are respectfully requested.

Respectfully submitted,

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October 7, 2004
Date